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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,246	10/20/2003	James Seaba	3994994-131917	3823

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EXAMINER

RIDLEY, BASIA ANNA

ART UNIT PAPER NUMBER

1764

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

*HC*

**Office Action Summary**

Application No.

10/689,246

*K-P*  
Applicant(s)

SEABA ET AL.

Examiner

Basia Ridley *BR*

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Specification*

1. Acknowledgment is made of applicant's claim for domestic priority under 35 U.S.C. 120. The specification should be amended to include current status of all referenced nonprovisional parent applications.

2. The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code (see [0002]. Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01.

3. The use of the trademark Inconel<sup>®</sup> has been noted in this application (see [0034]). It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

4. The disclosure is objected to because of the following informalities:

- the disclosure includes references to related applications (see paragraphs 0020, 0032 and 0035; the disclosure should be amended to include current status of all referenced applications;
- the chemical equations in the specification sometimes use "=" and sometimes use "→" (for example, see paragraph 0018), the specification should be amended to consistently use either "=" or "→" in chemical equations;
- in Table I, the temperatures for Module Reference Numbers 46, 54 and 60 include a +/- sign, but there is not temperature following said sign;
- in Table II, the reference numbers for the Flow Sides are not consistent with the drawings, for

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example regarding Module Reference No. 14, in Fig. 1, "14a" refers to a combustor and "14b" refers to a heater, and in Table II "14a" refers to a vaporizer and "14b" refers to a catalytic combustor, similar inconsistencies can be found in reference to other Modules;

- in Table II regarding Module Reference No. 34, recites "Oxidation side (...) To produce syn-gas" and "Steam Reformer side (...) Combustor", which appears inconsistent.

Appropriate correction is required.

### *Drawings*

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

- "18a" is not Fig. 4
- "22a" and "22b" not in drawings;
- "42a" and "42b" not in drawings;
- "50a" and "50b" not in drawings;
- "54a" and "54b" not in drawings.

6. The drawing(s) is/are objected to because, in Fig. 1, a line indicating a stream and connecting vaporizer 18B and a stream entering heat exchanger 30 is lacking an arrow indicating flow direction. It is not clear if said stream is leaving or entering vaporizer 18B.

7. The drawing(s) is/are objected to because Fig. 1 includes a stream system which branches out to enter parts 22, 34A, 18A, 26 and 14A but which does not have a starting point.

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference signs not mentioned in the description: "331" and "332" in Fig. 3C.

9. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR

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1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Analysis*

10. Claims 1, 5-9 and 11-12 recite "a system" which does not clearly indicate which statutory category of invention is being claimed. It has been determined that these claims are directed to an apparatus and the appropriate principles for interpreting claims for that particular category of invention have been applied.

### *Claim Objections*

11. Claim(s) 2-9 and 11-12 are objected to because of the following informalities:

- claim 2 recites "A micro component power source in accordance with claim 1", said recitation should be replaced with --The system in accordance with claim 1--;
- claim 2 recites "an off gas" (line 4), "a combustor" (line 6) and "a steam reformer" (lines 9 and 12), said recitations should be replaced with --the off gas--, --the combustor-- and --the steam reformer--, respectively, because said elements are already recited in claim 1;
- claims 3-4 recite "The device of claim 1 or claim 2", said recitation should be replaced with --The system of claim 1 or claim 2--;
- claim 7 recites "Zeolite", suggested correction is --zeolite--;
- claim 11 recites "An incrementally scalable power source in accordance with claim 1", said

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recitation should be replaced with --The system in accordance with claim 1--;

- claim(s) 12 recite "The device of claim 11", said recitation should be replaced with --The system of claim 11--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1-4 and 8-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Tonkovich et al. (WO 99/00186).

Regarding claim 1, Tonkovich et al. discloses a system for producing syn-gas enriched with hydrogen comprising:

- a mixer for producing a feedstock of vaporized hydrocarbons and water vapor (P2/L1-5);
- a steam reformer (410) into which feedstock is directed (P9/L31-35);
- a combustor (404) for generating heat energy from fuel cell off gas (400) and vaporized hydrocarbons to heat the steam reformer (P9/L19-35);
- an exit from the steam reformer (410) for the syn-gas produced therein (Fig. 4);
- including means for providing in at least one of the stages in the system a laminar flow of fluid to effect an energy exchange between fluids (P1/L8-13).

Regarding claim 2, Tonkovich et al. discloses all of the claim limitations as set forth above, additionally the reference disclose the system comprising:

- a fuel cell (402) that consumes hydrogen and exhausts an off gas (400) containing hydrogen;

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- a combustor (404) for burning the fuel cell off gas (400) to provide a source of heat energy for transferring heat to steam reformer(410);
- a stem reformer (410) for receiving a mixture of hydrocarbon compositions and water and catalytically reforming the mixture into a gas enriched with hydrogen;
- a flow path (408) between the steam reformer (410) and the fuel cell (402) for introducing the gas enriched with hydrogen into the fuel cell (402).

While the reference does not explicitly disclose means for introducing hydrocarbon compositions and water from a source into the cycle, said means are inherent in disclosed system.

Regarding claims 3-4, 8-9 and 11-12, Tonkovich et al. discloses all of the claim limitations as set forth above, additionally the reference disclose the system:

- wherein a heat exchanger directs fluids between which heat is exchanged into adjacent laminar flows (P1/L8-13);
- wherein the means for providing laminar flow includes a catalytically active surface in contact with fluid flow (P9/L15-16);
- said system in operative combination with a fuel cell (402);
- including a start module comprising a heat exchanger with adjacent sections for laminar flow in which hydrogen from an external source is combusted to provide heat energy in one section and hydrocarbon fluids are vaporized in an adjacent section to imitate the vaporization of fluids and steam reforming in the system (P1/L8-13, P9/L19-35);
- in which the laminar flow unit is a micro channel having a width to depth aspect ratio of from about 1:10 to about 1:100 (P1/L8-13).

Regarding limitations recited in claims 1-4, 8-9 and 11-12 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or

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article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 10, Tonkovich et al. discloses a cycle comprising:

- combusting (404) a gas mixture including a hydrogen component to heat at least one vaporizer and a steam reformer (410);
- providing a vaporized hydrocarbon and water mixture and introducing the mixture into the steam reformer (410) to produce a feed gas (P9/L31-35);
- cooling the feed gas and introducing the feed gas into a hydrogen fuel cell; and
- combusting (404) the off gas (400) from the fuel cell to heat the vaporizer and steam reformer (P9/L19-35).

### ***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tonkovich et al. (WO 99/00186) in view of Bonville et al. (WO 99/67018).

Regarding claim 5, Tonkovich et al. discloses all of the claim limitations as set forth above. Additionally the reference discloses system including a water gas shift reactor and a preferential



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oxidation reactor, whereby gas predominantly comprised of hydrogen is introduced into the fuel cell (P9/L35-P10/L2), but the reference does not explicitly disclose a second heat exchanger for cooling the gas from the steam reformer.

Bonville et al. teaches a system for producing syn-gas enriched with hydrogen comprising at least one second heat exchanger for cooling the gas from the steam reformer (P8/L20-P9/L7). Said heat exchangers are necessary to bring the reformed gas to the temperature required by shift reactor, additionally the heat of said reformed gas is used to heat other streams in the system.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to pass a reformed gas of Tonkovich et al. into a cooling heat exchanger, as taught by Bonville et al., before passing said reformed gas into a shift converter, for the purpose of improving heat efficiency of the system by bringing said reformed gas to the temperature required by shift reactor, by using energy of said reformed gas heat other streams in the system.

Regarding claims 6, Tonkovich et al. in view of Bonville et al. discloses all of the claim limitations as set forth above. Additionally, while the references do not explicitly disclose one or more storage tanks for separately storing at least one of fuel cell off gas, a liquid hydrocarbon composition and water, said tanks are inherent in disclosed system.

16. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tonkovich et al. (WO 99/00186) in view of Dixon (USP 3,929,430).

Regarding claims 7, Tonkovich et al. discloses all of the claim limitations as set forth above. Additionally the reference discloses various fuels, including gasoline, which can be used for production of hydrogen in the reformer (P5/L8-10), but the reference does not explicitly disclose said system including an in-line zeolite cracker.

Dixon teaches that various hydrocarbon fluids can be cracked in an in-line zeolite cracker to

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produce gasoline, which then can be used in a reformer to produce synthesis gas (C4/L6-27).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide an in-line zeolite cracker in the system of Tonkovich et al., as taught by Dixon, for the purpose of adapting the system of Tonkovich et al. to use various fuels. This way systems flexibility is increased, which usually offers economical advantage over more limited systems.

### ***Double Patenting***

17. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

18. Claims 1-4, 8-9 and 11-12 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-25 of U.S. Patent No. 6,716,400.

Although the conflicting claims are not identical, they are not patentably distinct from each other because said claims 1-4, 8-9 and 11-12 of the instant application recite only the limitations which are recited in claims 1-25 of U.S. Patent No. 6,716,400.

19. Claims 5-6 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-25 of U.S. Patent No. 6,716,400 in view of Bonville et al. (WO 99/67018).

Regarding claims 5, claims 1-25 of U.S. Patent No. 6,716,400 recites all of the instant claim limitations as set forth above, but they do not recite any purification steps for the reformed

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gas before said gas can be introduced into the fuel cell.

Bonville et al. teaches a system including reforming, for producing syn-gas enriched with hydrogen for fuel cell, said system comprising at least one second heat exchanger for cooling the gas from the steam reformer, a water gas shift reactor and a preferential oxidation reactor, whereby gas predominantly comprised of hydrogen is introduced into the fuel cell (P8/L18-P10/L10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to pass a reformed gas of claims 1-25 of U.S. Patent No. 6,716,400 into the purifying system of Bonville et al., before passing said reformed gas into a fuel cell, for the purpose of protecting said fuel cell from carbon monoxide.

Regarding claims 6, claims 1-25 of U.S. Patent No. 6,716,400 in view of Bonville et al. discloses all of the claim limitations as set forth above. Additionally, while the references do not explicitly disclose one or more storage tanks for separately storing at least one of fuel cell off gas, a liquid hydrocarbon composition and water, said tanks are inherent in disclosed system.

20. Claim 7 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-25 of U.S. Patent No. 6,716,400 in view of Dixon (USP 3,929,430).

Regarding claims 7, claims 1-25 of U.S. Patent No. 6,716,400 recite all of the claim limitations as set forth above, but they do not recite said system including an in-line zeolite cracker.

With respect to Dixon the same comments apply as set forth above.

### ***Conclusion***

21. In view of the foregoing, none of the claims are allowed.

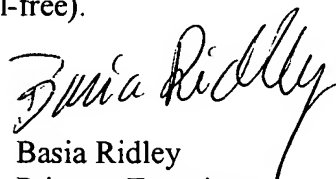
22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Technical Center 1700 General Information Telephone No. is (571) 272-1700. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Basia Ridley', is positioned above the printed name and title.

Basia Ridley  
Primary Examiner  
Art Unit 1764

BR

September 4, 2005